

PATENT APPLN. NO. 10/531,047
RESPONSE UNDER 37 C.F.R. §1.111

PATENT
NON-FINAL

REMARKS

Claims 1-28 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Fukui et al., WO2002/21616 ("Fukui") in view of Masatoshi et al., JP 2003-086243 ("Masatoshi"). The Office is using the U.S. publication, U.S. Patent Application Publication No. 2004/0043294, of the national stage application of Fukui for citation purposes. Claim 29 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Fukui in view of Masatoshi as applied to claims 1-28 and further in view of Lee et al., U.S. Patent Application Publication No. 2004/0213985.

The claims of the present application are directed to a rechargeable lithium battery and to a method for fabricating the rechargeable lithium battery. The rechargeable lithium battery of the present invention, as recited in claim 1, comprises a negative electrode made by sintering a layer of a mixture of active material particles containing silicon and/or a silicon alloy and a binder on a surface of a conductive metal foil current collector, a positive electrode and a nonaqueous electrolyte, and is characterized in that the nonaqueous electrolyte contains carbon dioxide dissolved therein.

The method of fabricating the rechargeable lithium battery of the present invention, as recited in claim 26, comprises the steps of:

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providing a layer of a mixture of active material particles containing silicon and/or a silicon alloy and a binder on a surface of a conductive metal foil as a current collector and sintering the mixture layer while being placed on said surface of the conductive metal foil to prepare said negative electrode;

dissolving carbon dioxide in said nonaqueous electrolyte; and
assembling a rechargeable lithium battery using said negative electrode, positive electrode and nonaqueous electrolyte.

In the rejections of the claims, Fukui is relied on by the Office as disclosing a rechargeable lithium battery which includes all of the limitations of the rechargeable lithium battery cited in claim 1 of the present application except for carbon dioxide dissolved in the electrolyte.

Masatoshi is identified by the Office as teaching the use of dissolved carbon dioxide in a nonaqueous electrolyte solution in a rechargeable lithium battery for the purpose of suppressing swelling.

The position of the Office in the rejection of claims 1-28 is that it would have been obvious in view of the teachings of Masatoshi to add carbon dioxide to the electrolyte of the battery of Fukui to suppress swelling.

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Applicants respectfully submit that the Office has not shown that the proposed combination of Masatoshi and Fukui will yield predictable results as the Office must do, in light of KSR, to support its conclusion of obviousness.

The invention of Masatoshi is directed to the use of carbon dioxide to suppress swelling in a nonaqueous electrolyte secondary battery that occurs with the use of a specific combination of a carbon material as the negative electrode and vinylene carbonate in the nonaqueous electrolyte. The Office has not provided any reasoning explaining why a person of ordinary skill in the art would have any motive (or reason) to add carbon dioxide to the electrolyte of the battery of Fukui in which the negative electrode is made by sintering a layer of a mixture of active material particles containing silicon and/or a silicon alloy and a binder on a surface of a conductive metal foil current collector and vinylene carbonate is not required to be included in the electrolyte.

There is no disclosure or suggestion in the art that the swelling that occurs in the battery of Masatoshi would occur in the different battery of Fukui (with or without the use of VC) in which the negative electrode is is made by sintering a layer of a mixture of active material particles containing silicon and/or a silicon alloy and a binder on a surface of a conductive metal foil current

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collector or that, if swelling occurs in the different battery of Fukui, such swelling could be suppressed by the addition of carbon dioxide as disclosed in Masatoshi without adverse effects.

In the absence of a showing of predictable results, the proposed combination of Masatoshi and Fukui cannot support a case of prima facie obviousness of claims 1-28.

The rejection of claim 29 depends on the propriety of the rejection of claims 1-28. Since the rejection of claims 1-28 is not proper for the reasons explained above, the rejection of claim 29 cannot stand.

The foregoing is believed to be a complete and proper response to the Office Action dated June 9, 2008.

In the event that this paper is not considered to be timely filed, applicants hereby petition for an appropriate extension of time. The fee for any such extension and any additional required fees may be charged to Deposit Account No. 111833.

Respectfully submitted,
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